What is claimed is:

1. a method of removing an oxide film containing radioactive nuclides and adhering to a contaminated object to be decontaminated as a component of a radioactive material handling facilities, said method comprising:

an oxidative dissolving process for dissolving the oxide film through oxidation using an ozone solution prepared by bringing ozone gas into contact with an acid solution.

2. The method according to claim 1, wherein the ozone solution has a pH value of 6 or below.

3. The method according to claim 1, wherein the ozone solution at temperatures in the range of 50 to 90° C is supplied to the contaminated object in the oxidative dissolving process.

4. The method according to claim 1, wherein the ozone gas is produced by an electrolytic ozonizer having an anode chamber formed on one side of a solid electrolyte and a cathode chamber formed on the other side of the solid electrolyte, and capable of generating ozone in the anode chamber by a solid electrolyte electrolysis process which decomposes pure water by electrolysis using an anode of a catalytic metal disposed in the anode chamber.

5. The method according to claim 1 further comprising a monitoring process for monitoring the oxidative dissolving ability by measuring oxidation-reduction potential of the ozone solution.

6. The method according to claim 1 further comprising a reductive dissolving process which supplies an organic acid solution as a decontaminating solution to the contaminated object to remove the oxide film through the reductive dissolution of the oxide film.

7. The method according to claim 6 further comprising:

a reducing agent decomposing process for decomposing an

organic acid remaining in the organic acid solution after the reductive dissolving process; and

a solute removing process for removing ions remaining in the ozone solution or in the organic acid solution.

8. The method according to claim 7, wherein the reducing agent decomposing process includes the steps of:

adding at least either ozone or hydrogen peroxide to the organic acid solution; and

irradiating the organic acid solution with at least either ultraviolet rays or radioactive rays.

9. The method according to claim 7, wherein the reducing agent decomposing process irradiates titanium oxide with light and brings titanium oxide into contact with the organic acid solution to use photocatalytic action of titanium oxide for decomposing the organic acid.

10. The method according to claim 7 further comprising an oxidizing agent decomposing process for decomposing ozone contained in the ozone solution by irradiating the ozone solution with ultraviolet rays or radiation after the oxidative dissolving process.

11. The method according to claim 6, wherein the organic acid solution used in the reductive dissolving process contains a salt of the organic acid contained in the organic acid solution in addition to the organic acid.

12. A decontamination system for removing an oxide film containing radioactive nuclides and adhering to a contaminated object as a component of a radioactive material handling facility, said decontamination system comprising:

a decontaminating liquid circulating system provided with a first pump for circulating a decontaminating liquid through the contaminated object;

an ozone supply system for supplying ozone to the

decontaminating liquid circulating in the decontaminating liquid circulating system;

a pH adjusting agent supply device for supplying a pH adjusting agent to the decontaminating liquid circulating in the decontaminating system;

an organic acid supplying device for supplying an organic acid as a reducing agent to the decontaminating liquid circulating in the decontaminating liquid circulating system;

an irradiating device for irradiating the decontaminating liquid circulating in the decontaminating liquid circulating system with light; and

an ion-exchange device for removing ions contained in the decontaminating liquid circulating in the decontaminating liquid circulating system.

13. The decontamination system according to claim 12 further comprising:

a bypass line connected to a line included in the first circulating system; and

a second pump disposed in the bypass line to circulate the decontaminating liquid through the bypass line and the contaminated object.

14. The decontamination system according to claim 12, wherein the circulating system is provided with a buffer tank,

wherein the ozone supply system comprises an ozonizer, a circulation line connected to the buffer tank, and mixing pump for mixing ozone generated by the ozonizer in the decontaminating liquid in the circulating line,

and wherein the pH adjusting agent supply device and the organic acid supply device are disposed so as to supply the pH adjusting agent and the organic acid, respectively, into the buffer tank.

15. The decontamination system according to claim 14, wherein the contaminated object is a member capable of being removed from the radioactive material handling facility, and the

buffer tank is capable of receiving the contaminated object for immersion in the decontaminating liquid contained therein.

16. The decontamination system according to claim 14 further comprising an ozone exhaust system including an ozone processing device connected to the buffer tank.

17. The decontamination system according to claim 16, wherein the ozone processing device is provided with activated charcoal or a metal oxide is used for decomposing ozone into oxygen.

18. The decontamination system according to claim 17 wherein the ozonizer is an electrolyzing device having an anode chamber formed on one side of a solid electrolyte and a cathode chamber formed on the other side of the solid electrolyte, and capable of generating ozone in the anode chamber by a solid electrolyte electrolysis process which decomposes pure water by electrolysis using an anode of a catalytic metal disposed in the anode chamber.

said system further comprising a catalytic combination device connected to the ozone processing device and the cathode chamber of the ozonizer to produce water from oxygen produced by decomposing ozone by the ozone decomposing device and hydrogen produced in the cathode chamber.

19. The decontamination system according to claim 16, wherein the ozone supply device is connected to the buffer tank by a line to return ozone gas escaped from an ozone solution contained in the buffer tank to the ozone supply device.

20. A method of removing an oxide film containing radioactive nuclides and adhering to contaminated objects, said contaminated objects including a reactor coolant pump for circulating a coolant for cooling a nuclear reactor, and a pipe having sections connected to an inlet side and an outlet side of the reactor coolant pump, respectively, and rising to a level

higher than that of the reactor coolant, said method comprising the steps of:

providing a decontamination system including a first and a second tube, means for producing a decontaminating liquid having a ozone gas generator and an organic acid supply device, and a decontaminating liquid circulating pump communicated to the first and the second tube;

inserting the first and second tube into the pipe; and

supplying the decontaminating liquid into the pipe through the first tube and discharging the decontaminating liquid through the second pipe so as to circulate the decontaminating liquid through an interior of the pipe and of the coolant circulating pump, while a level of the decontaminating liquid in the pipe is maintained so that the interior of the coolant circulating pump is filled up with the decontaminating liquid.